CLAIMS

1. An actuator component for a drop on demand ink jet printer, said component comprising a body having a top surface, an opening in said top surface extending into said body along an opening axis, an actuator structure located substantially within said opening and electrode means; said electrode means being disposed so as to be able to apply a field to said actuator structure so as to cause said actuator structure to deform.

2. A component according to Claim 1, wherein said opening extends from the top surface to a bottom surface opposite said top surface.

3. A component according to Claim 1 or Claim 2, wherein said actuator structure is an isolated actuator structures.

4. A component according to any preceding claim, wherein said actuator structure extends as an impermeable wall across said opening.

5. A component according to any preceding claim, wherein said actuator structure tapers along said opening axis.

6. A component according to Claim 5, wherein said actuator comprises a flat portion at the end of said taper; said flat portion comprising an upper surface and a lower surface; said upper and lower surfaces lying parallel with said top and bottom surfaces.

7. A component according to Claim 6, wherein said upper surface lies in the plane of said top surface.

8. A component according to Claim 6 or Claim 7, wherein said lower surface lies within said opening.

9. A component according to any one of Claim 6 to Claim 8, wherein both said top surface and said bottom surface can move in said opening direction.

10. A component according to any one of Claim 1 to Claim 4, wherein said actuator structure is convex.

11. A component according to any preceding claim, wherein a plurality of openings is provided; each of said openings comprising a respective actuator structure.

12. A component according to any preceding claim, wherein said openings are bounded by at least one opening surface; each of said at least one opening surfaces lying perpendicular to the plane of said top surface.

13. A component according to Claim 12, wherein said opening surface extends radially around said opening.

14. A component according to Claim 12, wherein a plurality of opening surfaces are provided.

15. A component according to Claim 14, wherein said plurality of opening surfaces define an opening that is elongate in a direction perpendicular to said opening axis; said opening being a channel.

16. A component according to any one of Claim 7 to Claim 10, wherein said actuator structure is attached to an opening surface at a point of attachment.

17. A component according to Claim 11, wherein said point of attachment extends substantially around said opening.

18. A component according to any preceding claim, wherein said actuator is formed of electrostrictive material.

19 A component according to Claim 18, wherein said electrostrictive material is a lead zirconate titanate ceramic.

20. A component for ejecting a droplet in a direction of droplet flight, said component comprising an actuator structure displaceable by actuation in the direction of said droplet flight; said actuator defining in part an ejection chamber and comprising a port through which said droplet is ejected.

21. A component according to Claim 20, further comprising electrode means, said electrode means being disposed so as to be able to apply a field to said actuator structure so as to cause said actuator structure to deform.

22. A component according to Claim 20 or Claim 21, wherein said actuator structure comprises elongate channel walls defining an elongate channel.

23. A component according to Claim 22, wherein said actuator structure provides a convex cross section when a cross section is taken orthogonal to the channel length.

24. A component according to Claim 23, wherein said port is provided in the roof of said convex cross-section.

25. A component according to Claim 22, wherein said actuator structure cross section tapers in said direction of droplet flight.

26. A component according to Claim 25, wherein said actuator comprises a flat portion at the end of said taper; said flat portion comprising an upper surface and a lower surface; said upper and lower surfaces lying on planes orthogonal to said direction of droplet flight.

27. A component according to any one of Claim 20 to Claim 26, wherein said actuator structure is homogenous.

28. A component according to any one of Claim 20 to Claim 27, wherein said actuator structure is mounted to a base; said base providing one wall of said ejection chamber.

29. A method of forming a component for an ink jet print head comprising the steps a) providing a body having a mould feature, b) forming a deformable actuator structure, the shape of said actuator structure being defined, at least in part by said mould feature, c) removing at least a portion of said mould feature and d) providing electrode means; said electrode means being disposed so as to be able to apply a field to said actuator structure so as to cause said actuator structure to deform whilst said actuator structure is attached to said body.

30. A method according to Claim 29, wherein said mould feature is provided by adding a material to a surface of said body.

31. A method according to Claim 30, wherein said surface is a top surface.

32. A method according to Claim 30, wherein said surface is a surface bounding an opening extending into said body.

33. A method according to Claim 30, wherein said material is a photoresist.

34. A method according to Claim 29, wherein said mould feature is provided by removing material from a surface of said body.

35. A method according to Claim 34, wherein said material is removed by etching.

36. A method according to Claim 29, wherein the step of forming said electrode means comprises a first step of forming a first electrode layer and a second step of forming a second electrode layer.

37. A method according to Claim 36, wherein said first electrode layer is formed before forming said deformable actuator structure.

38. A method according to Claim 37, wherein said first electrode means are immersed in a suspension comprising dispersed particles.

39. A method according to Claim 38, wherein said dispersed particles comprise piezoelectric material.

40. A method according to Claim 38 or Claim 39 wherein a deposition electrode is immersed in said suspension with said first electrode means for applying a voltage therebetween and thereby depositing said dispersed particles on said first electrode means.

41. A method according to any one of Claim 36 to Claim 40, wherein said second electrode layer is formed after forming said deformable actuator structure.

42. A method according to Claim 29, wherein the step of removing at least a portion of said mould feature is achieved by etching.

43. A method according to Claim 29, wherein the step of removing at least a portion of said mould feature is achieved by washing.

44. A method according to Claim 29, wherein the step of removing at least a portion of said mould feature is achieved by application of heat.

45. A method of forming a component for an ink jet print head comprising the steps a) providing a body having a top surface, b) forming an opening in said top surface and extending into said body and; c) forming within said opening an actuator structure; said actuator structure remaining attached to said body during actuation.

46. A method according to Claim 45, wherein said actuator structures are isolated actuator structures.

47. A method according to Claim 45 or Claim 46, comprising the step of forming a plurality of openings.

48. A method according to Claim 45, wherein said opening is formed by etching material from said top surface.

49. A method according to Claim 48, wherein a mask is applied to the body and the opening thus formed tapers with increasing depth.

50. A method according to any one of Claim 45 to Claim 49, wherein electrode means are applied to an inner surface of said opening.

51. A method according to Claim 50, wherein said electrode means are immersed in a suspension comprising dispersed particles.

52. A method according to Claim 51, wherein said dispersed particles comprise piezoelectric material.

53. A method according to Claim 51 or Claim 52, wherein a deposition electrode is immersed in said suspension with said first electrode means for applying a voltage therebetween and thereby depositing said dispersed particles on said first electrode means.

54. A method according to Claim 53, wherein said deposited dispersed particles are heated to form said actuator structure.

55. A method according to any one of Claim 45 to Claim 49, comprising the steps supplying a slurry comprising particles within said opening, the slurry at least partly conforming to the shape of said opening.

56. A method according to Claim 55, wherein said particles are of a piezoelectric material.

57. A method according to Claim 55 or Claim 56, wherein said slurry is heat treated to form said actuator structure.

58. A method according to any one of Claim 45 to Claim 49, wherein a flexible sheet of a piezoelectric material is laid within said opening by applying a pressure difference thereto; said sheet at least partly conforming to the shape of said opening.

59. A method according to Claim 58, wherein said sheet is heat treated to form said actuator structure.

60. A method according to any one of Claim 45 to Claim 49, wherein a film of piezoelectric material is deposited within said opening using a sputtering process; said film at least partly conforming to the shape of said opening.

61. A method according to Claim 59, wherein said sputtering process comprises three metal targets of Lead, Titanium and Zirconium.

62. A method according to any one of Claim 60 to Claim 61, wherein said film is heat treated to form said actuator structure.

63. A channelled component for a drop on demand ink jet printer comprising elongate channel walls defining a plurality of elongate liquid channels, each channel comprising one wall that is resiliently deformable in an actuation direction orthogonal to the channel length; a respective ejection nozzle connected with the channel at a point intermediate its length; a liquid supply providing for continuous flow of liquid along said channel; acoustic boundaries at respective opposite ends of the channel serving to reflect acoustic waves in the liquid of the channel wherein the inter-channel spacing of said acoustic boundaries is different to the inter-channel spacing of said nozzles.

64. A channelled component according to Claim 63, wherein the inter-channel spacing of said acoustic boundaries is less than that of the inter-channel spacing of said nozzles.

65. A channelled component according to Claim 63, wherein channels are chevron shaped.

66. A channelled component according to Claim 65, wherein a series of chevron shaped channels is arranged to one side of a straight channel, the angle of said chevron shaped channels being more acute with increasing distance from said straight channel.

67. A channelled component according to Claim 66, wherein a reversed second series of chevron shaped channels is arranged on the opposite side of said straight channel.

68. A channelled component according to any one of Claim 63 to Claim 67, wherein said channels are arranged on a tile, an array of nozzles extending linearly across said tile.

69. A channelled component according to Claim 68, wherein a plurality of like tiles are butted together along respective edges and wherein there is provided an array nozzles having an equal linear nozzle spacing across the width of the like tiles and across the butt joint.

70. A channelled component according to Claim 69, wherein said respective edges are serrated.

71. A channelled component according to Claim 70, wherein the serrations of respective edges are interleaved.

72. Apparatus as substantially hereinbefore described with reference to Figures 1 to 21.

73. A method of manufacture as substantially hereinbefore described with reference to Figures 1 to 21.